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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/564,073	01/10/2006	Masakazu Kawai	SAT-16451	6001

40854 7590 12/31/2009

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EXAMINER	
DANEGA, RENEE A	
ART UNIT	PAPER NUMBER
3736	
MAIL DATE	DELIVERY MODE
12/31/2009	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/564,073	KAWAI ET AL.	
	Examiner	Art Unit	
	Renee Danega	3736	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *01 September 2009*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-7* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-7* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 1-7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dariush (US 20030018283) in view of Takenaka (US 6289265).

3.

- Regarding claim 1, Dariush teaches a method of estimating a joint moment of a bipedal walking body, comprising:

a first step for sequentially grasping the displacement amounts of a plurality of joints, including at least an ankle joint, a hip joint and a knee joint of each leg of a bipedal walking body (Figures 13-14-15);

a second step for sequentially grasping the positions and/or postures of corresponding rigid bodies of the bipedal walking body that are associated with rigid elements of a rigid link model using at least the rigid link model, the rigid link model being established beforehand to express the bipedal walking body in the form of a link assembly composed of a plurality of the rigid elements and a plurality of joint elements and the grasped displacement amounts of the joints [0088] (Figure 2);

a third step for grasping the acceleration of a preset reference point of the bipedal walking body [0094]

and a fourth step for sequentially grasping a floor reaction force acting on each leg and the position of an acting point of the floor reaction force, the grasped positions and/or the postures of the corresponding rigid bodies of the bipedal walking body, the acceleration of the reference point, the floor reaction force, and the position of the acting point of the floor reaction force being used to estimate a joint moment acting on at least one joint of each leg, wherein at least the displacement amounts of the hip joint, the knee joint, and the ankle joint of each leg that are grasped in the first step include the amount of rotation about an axis substantially perpendicular to a leg plane as a plane passing through these three joints, the displacement amount of the hip joint is a three- dimensional amount, the positions and/or postures of the corresponding rigid bodies grasped in the second step include at least the positions and/or the postures of the corresponding rigid bodies of the leg on the leg plane, the acceleration of the reference point grasped in the third step and the floor reaction force and the position of the acting point of the floor reaction force grasped in the fourth step are three- dimensional amounts, and a component of a joint moment acting on at least one joint of the leg about the axis that is substantially perpendicular to the leg plane is estimated on the basis of an inverse dynamic model representing the relationship between the motions of the corresponding rigid bodies of the leg and the translational forces and the moments acting on the corresponding rigid

bodies on the leg plane by using the two- dimensional amounts obtained by projecting at least the acceleration of the reference point, the floor reaction force, and the position of the acting point of the floor reaction force onto a leg plane related to the leg on the basis of a displacement amount of the hip joint of the leg, and the positions and/or the postures of the corresponding rigid bodies of the leg on the leg plane [0094] (Figure 5, 7). Dariush teaches using acceleration but doesn't expressly teach collecting the acceleration data. However, Takenaka teaches a method for controlling and estimating joint movement of a bipedal walking body in which hip knee and ankle joint displacements are measured by using at least an output of an acceleration sensor means (60) attached to a predetermined region of the bipedal walking body (S31) in order to determine posture stability (Figures 1, 10). It would have been obvious in view of Takenaka to provide an acceleration sensor in Dariush and measure acceleration from that point in order to determine posture stability.

- Regarding claim 2, Dariush teaches the method may be extended to three dimensional systems [0098] but doesn't expressly teach finding values in the third and fourth step in three-dimensional amounts. However, Takenaka teaches finding joint moments by finding three-dimensional acceleration of a reference point, floor reaction force, and point of the acting point of the floor reaction force (Figures 1, 17) (column 11, lines 12-30). It would have been obvious to one of ordinary skill in the art to modify the method as taught by Dariush with the three dimensional methods and

of Takenaka in order to increase the efficacy of controlled movement in a biped walking system.

- Regarding claims 3-5, Dariush teaches determining the overall center of gravity based on joint displacement of legs. Dariush teaches determining center of gravity by using displacement amounts of the joints and of the floor reaction and inclination angle relative to vertical of the ankle and toe joint wherein he determines whether the body is in a one-leg or two leg supporting state [0052] [0053] but doesn't expressly teach center of gravity exists rearward or forward of the body. However, Takenaka teaches determining center of gravity to be rearward when the ankle joint contacts the ground and forward the body when the toe joint contacts the floor. It would have been obvious to one of ordinary skill in the art to modify the method as taught by Dariush with the center of gravity estimates of Takenaka in order to increase the efficacy of controlled movement in a biped walking system.
- Regarding claims 6-7, Kato doesn't expressly teach the acting point of a reaction force as a position away downward from a specified value. However, Takenaka teaches the estimate of the vertical position of the acting point of a floor reaction force acting on a leg in contact with the ground at the toe or ankle as the position away downward in the vertical direction by a predetermined value specified beforehand (Figures 6, 7). It would have been obvious to one of ordinary skill in the art to modify the

method as taught by Dariush with the three dimensional methods and of Takenaka in order to increase the efficacy of controlled movement in a biped walking system.

Response to Arguments

4. Applicant's arguments, see pages 11-12, filed 9/1/09, with respect to the rejection(s) of the claims under Kato and Takenaka have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of Dariush.

5. Dariush teaches using non linear feedback in bipedal simulation and Takenaka teaches a method for estimating bipedal movement. Both references estimate movement and both are trying to simulate human movement and thus are analogous art.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Renee Danega whose telephone number is (571)270-3639. The examiner can normally be reached on Monday through Thursday 8:30-5:00 eastern time.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Max Hindenburg can be reached on (571) 272-4726. The fax phone

number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

RAD

/Max Hindenburg/
Supervisory Patent Examiner, Art Unit 3736